

REMARKS

Applicant wishes to thank the Examiner for the attention accorded to the instant application, and respectfully requests reconsideration of the application based on the following remarks.

Claims 1, 3, 6, 7, 12, 14, 17, 18, 23, 25, 28, 29, and 34-42 are pending in the application.

Rejection of Claims Under 35 U.S.C. §103

Claims 1, 3, 6, 12, 14, 17, 23, 25, 28, 29, 35, 38, and 41 are rejected under 35 U.S.C. § 103(a) as unpatentable over Bjorn, U.S. Patent Application Publication No. 2001/0040987 in view of Nakajima, U.S. Patent No. 6,094,499. This rejection should be withdrawn based on the comments and remarks herein.

The present invention provides a fingerprint authentication method capable of judging whether input data is proper from various viewpoints, and also capable of performing fingerprint authentication with a high degree of accuracy, at low cost and in a short time. The inventive device and method takes into account at least three factors to judge the authenticity of the fingerprint. These factors are the outside light unrelated to the light source of the fingerprinting device, whether the object on the fingerprint sensor has the characteristics suitable for a fingerprint, and whether the object is properly put onto the fingerprint sensor. Judging whether these factors are met and whether the input data is proper is done using a spatial frequency analysis of the input data. Two predetermined spatial frequency bands are used in a Fourier transformed image to calculate feature values representing features of the spatial distribution of brightness of the input data. These procedures enable the high degree of accuracy obtained by the invention.

As the Examiner acknowledges, Bjorn does not disclose taking Fourier energy measurements. Moreover, Bjorn merely discloses fingerprint detection as a measurement of the energy level of the light received from the sensor platen (paragraph [0053]). If no fingerprint is detected or sensed, then the process continues to wait for a fingerprint to be sensed (paragraph [0065]). However, if a fingerprint is detected, the image is captured, digitized, and then subtracted from the digitized background to produce a differential print (Figure 5, 530), which is a clearer representation of the fingerprint placed on the sensor plate. Hence, Bjorn teaches assuming that the item on the sensor plate is a fingerprint and using a differential print to more clearly represent the assumed fingerprint. Bjorn does not disclose or suggest judging whether the input data are proper for authenticating, that is, whether the item detected or sensed on the sensor platen 160 is a fingerprint as opposed to, for example, a computer mouse inadvertently placed on the sensor platen. Thus, even if the process of Nakajima, discussed further below, were combined with Bjorn, the result would not be “a second step of *judging whether the input data are proper for authentication*, said second step performed using a spatial frequency analysis of an input image represented by the input data” as recited in claims 1, 12 and 23.

The Examiner also contends that Nakajima’s disclosure of the Fourier transform of an image representing the magnitudes of the intensity/brightness at different levels of frequency as shown in equation 1, in which A and B are amplitude values of the Fourier transformed fingerprint image which represent the strengths of the image brightness frequency, discloses step 2 of the present invention. Applicant respectfully disagrees. Nakajima discloses determining collation fingerprint Fourier image data (column 9, lines 46-51) and registration fingerprint Fourier image data (column 9, lines 1-3), and combining these data, as shown in equation 1, to produce synthesized Fourier image data (column 9, lines 55-67). Nakajima further discloses

“collation between the registration fingerprint and the collation fingerprint is performed on the basis of the intensities of the correlation components of the respective pixels in a correlation component area appearing in the synthesized Fourier image data having undergone this two-dimensional discrete Fourier transform (column 11, lines 9-14, emphasis added). Hence, Nakajima discloses determining collation between registration fingerprint data and collation (input) fingerprint data by analyzing Fourier image data that is a combination or synthesis of the registered and input data. Nakajima does not disclose or suggest feature values representing features of the spatial frequency distribution of brightness of only the input image, and hence does not disclose or suggest judging whether the input data are proper for authentication *using a spatial frequency analysis of an input image represented by input data* as recited in independent claims 1, 12 and 23.

It has been held by the courts that to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. See, *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). As illustrated above, the hypothetical combination of Nakajima and Bjorn does not disclose “a second step of judging whether the input data are proper for authentication, said second step performed using a spatial frequency analysis of an input image represented by the input data” and does not disclose or suggest each and every feature recited in independent claims 1, 12 and 23. Thus *prima facie* obviousness has not been established. Accordingly, claims 1, 12 and 23 are distinguishable over the art of record in the application. Claims 3, 6, and 35 depend from claim 1, claims 14, 17 and 38 depend from claim 12, and claims 25, 28, 29 and 41 depend from claim 23, each incorporating all of the features of its base claim. Thus the dependent claims are patentable over the art of record for at least the

reasons that their base claims are patentable over the art of record. Accordingly, this rejection should be withdrawn.

Rejection of Claims Under 35 U.S.C. §103

Claims 7 and 18 are rejected under 35 U.S.C. § 103(a) as unpatentable over Bjorn, in view of Nakajima as applied to claims 1 or 3 further in view of Modl, U.S. Patent No. 6,782,120; claims 34, 37, and 40 are rejected under 35 U.S.C. § 103(a) as unpatentable over Bjorn, in view of Nakajima as applied to claims 1 or 3 further in view of Vajna, U.S. Patent No. 6,330,347; and claims 36, 39, and 42 are rejected under 35 U.S.C. § 103(a) as unpatentable over Bjorn, in view of Nakajima as applied to claims 1 or 3 further in view of Kamei, U.S. Patent No. 6,067,369. These rejections should be withdrawn based on the comments and remarks herein.

As discussed above, Nakajima and Bjorn, taken singly or in combination, do not disclose or suggest “a second step of judging whether the input data are proper for authentication, said second step performed using a spatial frequency analysis of an input image represented by the input data” as recited in independent claims 1, 12 and 23. Neither Modl, nor Vajna, nor Kamei, taken singly or in any combination, overcome this deficiency, and the Examiner does not state otherwise. Hence, *prima facie* obviousness has not been established, and independent claims 1, 12 and 23 are patentably distinguishable from the art of record in the application. Claims 7, 34 and 36 depend from claim 1, claims 18, 37 and 39 depend from claim 12, and claims 40 and 42 depend from claim 23, each dependent claim incorporating all of the features of its base claim. Thus the dependent claims are patentable over the art of record in the application for at least the reasons that their base claims are patentable over the art of record in the application. Accordingly, this rejection should be withdrawn.

Conclusion

For at least the reasons set forth in the foregoing discussion, Applicant believes that the Application is now allowable, and respectfully requests that the Examiner reconsider the rejection and allow the Application. Should the Examiner have any questions regarding this Amendment, or regarding the Application generally, the Examiner is invited to telephone the undersigned attorney.

Respectfully submitted,



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